Donor Health Questionnaire and Physical Examination as a Tool for Re-Examination of Causes for Donor Deferral in a Tertiary Care Hospital

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ABSTRACT

Objective: To reassess the reasons for blood donor deferrals as per donor history questionnaire and physical examination findings.

Study Design: Cross-sectional study.

Place and Duration of Study: Blood Bank, Dr. Ziauddin Hospital, Karachi Pakistan, from Jan 2017 to Dec 2020.

Methodology: After approval from the Ethical Review Committee, all donors reporting at the blood bank were included. All donors were interrogated via a detailed donor health questionnaire. Data for donor history and physical examination findings were retrieved from the Blood Bank Information Software System (BBIS).

Results: During the study period, 33,095 donors reported at the.

Blood Bank. Of the total donors, 25,531(77.1%) were accepted and donated blood, while 7564(22.9%) were deferred for different reasons. The majority of donations were from males (32773,99.0%), and female donations accounted for 1%, while females accounted for more deferrals as compared to males. Most deferrals were due to low Hemoglobin (2722,36%), followed by injection/needle stick injuries (1994,26.4%).

Less common causes observed were donors not feeling fit for donations, medications, etc.

Conclusion: In our study, the deferral rate was 22.9%, with low haemoglobin being the most common cause, followed by injections/needle stick injuries.

Keywords: Donor deferral, Donor health questionnaire (DHQ), Low haemoglobin.

INTRODUCTION

Ensuring a safe and successful blood donation, from the selection of a healthy donor to the transfusion of an appropriate recipient, is the ultimate goal of a blood transfusion team. The Donor selection process is rigorous, starting from the information brochure and Donor Health Questionnaire.[1] Donor History Questionnaires have a well-defined impact on donor deferral or acceptance.[2] A detailed and comprehensive donor history questionnaire is an appropriate tool that reflects the donor's general well-being and ensures the recipient's safety by identifying donors at risk of spreading transfusion-transmitted infections.[3]

Above all, the Donor Health Questionnaire and physical examination are the cost-effective approaches for preventing transfusion-transmitted infections as detailed queries relevant to previous health issues can be acknowledged, and vulnerable donors can be excluded.[4,5] In Pakistan, the frequency of blood donation is less than one per cent. However, increased demand for more than 1.5 million bags per year due to the high prevalence of nutritional deficiency anaemia and thalassemia.[6] Deferral may harm blood donations, and temporarily deferred donors may not return for a donation, which further lowers this percentage.[7,8]

Moreover, there is a constant need to monitor and review Donor selection criteria as changes in donor population and transfusion demand impact blood collection to transfusion ratio and thus lead to restraining blood products over or under-production.[9,10] This research was being carried out to determine the pattern of donor deferral due to history and physical examination, as well as the factors that need to be altered to meet the demand for blood products. Furthermore, this research can aid in formulating and updating minimal donor deferral selection criteria.

METHODOLOGY

The cross-sectional study was conducted at the Blood Bank of Dr Ziauddin Hospital, North Nazimabad Karachi Pakistan from Januray 2017 to December 2020. after obtaining ethical approval (Reference code: 1661219MAHEM) from the Ethical Review Committee of Dr Ziauddin Hospital. The

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sample size was analyzed using the WHO sample size calculator, taking the prevalence of donor deferrals as 4.02%.[8] The Sample size was increased to make the data representative.

Inclusion Criteria: Donors above 12 years who came to the Blood Bank as a replacement for a relative or friend were designated as Directed Donors, while those who donated willingly and without payment were categorized as Voluntary Donors, as per the guidelines.

Exclusion Criteria: Refusal of informed consent, pregnant females and mentally and physically handicapped individuals were excluded from the study.

Data regarding donors was retrieved from the Blood Bank Information System. All donors reported from January 2017 to December 2020 were included in the study by consecutive sampling. Guidelines approved by the American Association of Blood Banks (AABB) were followed for recruiting donors.

The donor selection process was done through the following steps. All candidates willing to donate blood were provided with an Information brochure and then interviewed through a detailed Donor Health Questionnaire, which contained queries regarding general well-being, medications for any illness (acute or chronic), blood donation in the last two months, vaccination within last three months, accidental needle stick injuries or therapeutic injections, tattoo or body piercing, dental procedures during last three months, shared blades for shaving in last three month, any surgical procedure during last six months, history of malaria and blood transfusion during last one year. Previous medical history was sought, including history of Tuberculosis, Complicated Cardiac, pulmonary and renal diseases, uncontrolled Diabetes mellitus, epilepsy and cancer. History of jaundice, seropositive Hepatitis B, Hepatitis C on HIV, sexual relationship with Hepatitis B, Hepatitis C or HIV patients were also investigated. Questions regarding menstruation and pregnancy were included for female donors. After the epidemic of COVID 19, questions related to symptoms of infection were added to the questionnaire. Those who fulfilled the criteria for donation based on a history questionnaire were considered qualified for the next step in which Hemoglobin estimation and physical examination, including weight, blood pressure, Pulse rate, temperature and haemoglobin measurement, were carried out. The donor's weight was assessed via a calibrated weighing scale. Blood Pressure and pulse measurement was undertaken by Digital Blood Pressure Monitor. Body temperature was measured by Thermoscan.

Under appropriate quality control measures, Hemoglobin estimation was done by assessment of capillary haemoglobin level through a Hemoglobin meter, which measures haemoglobin by photometry.

Informed consent was taken from persons qualifying for donations, and accepted donors were bleed. Criteria for acceptance for blood donation included donor's age: 18-55 years, Hemoglobin greater than or equal to 12.5 g/dl, Blood pressure: Systolic: 100-180 mmHg, Diastolic: 50-100 mmHg, Pulse: 50-100 beats per minute, Temperature: <37.50C, Weight: greater than or equal to 50kg. All data from Donor selection to product use was entered into the software (Blood Bank Information System).

Statistical Package for Social Studies (SPSS-21) was used for data analysis. Descriptive statistics was used to summarize categorical variables like gender, history of vaccination, history of medications, etc., and results were reported as frequencies and percentages.

RESULTS

During the study period, the blood bank recruited 33095 whole blood donors. 25529(77.1%) of whole blood donors were accepted, while 7564(22.9%) were turned down for various reasons. Males comprised 32773(99%) of total donors, while females comprised 322(1%). Less than 18 years, 18-25 years, 26-35 years, 36-45 years, 46-55 years, and more than 55 years were among the age groups represented for donations, with 29(0.1%), 13470(40.7%), 14128(42.7%), 4714(14.2%), 745 (2.3%), and 9(0.02 %) respectively. Most contributors were directed donors, accounting for 23807(99.1%), while voluntary donors accounted for only 228(0.9%).

Among total whole blood donors, 25529 (77.1%) were accepted, while 7564 (22.9%) were deferred for different reasons. Deferral observed in female donors [218 out of 322(67.7%)] was higher than in male donors [7348 out of 25425(22.4%)]. Deferral in both genders was most commonly due to low haemoglobin. Low haemoglobin was the most common cause of deferral (36 %), followed by injections and needle stick injuries (26.4%). Other reasons involved donors not feeling well enough to volunteer (9.3%), medications (4.3%), dental work (3.4%), and others (Table).

DISCUSSION

Inadequate and inappropriate supply of blood products is still of high concern among low socioeconomic countries due to lack of donations, higher

Table: Frequency of defferals according to age and gender

Defferal Cause	<18 Years		18-25 Years		26-35years		36-45years		45-55years		>55 Years		Total n(%)
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Low Hemoglobin	0	0	846	36	1182	73	441	58	76	10	0	0	2722(36
High/Low Blood Pressure	0	0	70	1	93	3	84	0	14	0	0	0	265(3.5)
Temperature	0	0	71	1	43	1	7	0	0	0	0	0	123(1.6)
Pulse	0	0	52	1	38	0	19	0	3	0	0	0	113(1.5)
High Hemoglobin	0	0	98	0	63	0	17	0	1	0	0	0	179(2.4)
Others 1	0	0	19	0	14	0	5	0	1	0	0	0	39(0.4)
Deferral On Examination	0	0	1156	39	1433	77	573	58	95	10	0	0	3441(45.4)
Injection/Needle Stick Injury	0	0	837	2	807	8	286	0	54	0	0	0	1994(26.4)
Donor Not Feeling Fit For Donation	0	0	229	3	276	2	150	3	41	1	0	0	705(9.3)
Medications	0	0	69	0	137	3	87	0	28	0	0	0	324(4.3)
Dental Work	0	0	86	0	106	1	51	0	11	0	0	0	255(3.4)
Malaria	0	0	111	0	97	0	29	0	3	1	0	0	241(3.2)
Vaccination	0	0	48	0	36	1	12	0	1	0	0	0	98(1.3)
Others2	28	1	198	2	163	2	74	4	23	0	11	0	506(6.7)
Deferral On History	28	1	1578	7	1622	17	689	7	161	2	11	0	4123(54.)
Grand Total	29		1585		1639		696		163		11		7564(100)

Low Hemoglobin: <12.5 gm/dl, High hemoglobin: >17gm /dl, Others 1: deferral due to Jaundice and irregular pulse, Others2: deferral due to age, severe systemic diseases like Heart disease, Chronic renal diseases, infections like typhoid, seropositive Hepatitis B, Hepatitis C or HIV, history of sharing blades, jaundice, history of piercing/ tattoo within 1 year, epilepsy/ cancer etc

deferral rates, and limited resources to identify the risk of TTIs.[9] Pakistan is a developing country with a population of 242,923,845, having a growth rate of approximately 1.95%.[10] Despite this increasing growth rate, Pakistan cannot meet its requirements and has a shortage of approximately 40%.[11] The first step towards any safe blood donation is the Donor Health Questionnaire, which is not only cost-effective but provides an open chance for a donor to answer according to his/her health status. It is crucial to assess every donor through a history questionnaire and physical examination to avoid missing a healthy donor. In this study, we determined the frequency of various reasons for deferral to minimize the loss of donors who can be beneficial and important to maintain a continuous supply of blood and blood products.

The rate of deferral in our study was discovered to be 22.1%. Ngoma et al. found a comparable deferral rate (23%) in a Japanese study. However, the donors included in this study had a maximum age limit of 24 years, and the study was focused on university students.[12] Saba *et al*. reported lower deferral rates at Peshawar (1.76 per cent). According to a literature review, there are no questions on the donor questionnaire on using accidental needle sticks or therapeutic injections.[13] Waheed *et al*. (4.3 per cent) also found a reduced deferral rate. Differences were seen in the lack of deferral due to a history of malaria, dental work, and unintentional needle sticks.[14]

When compared to International studies, our analysis revealed a higher deferral rate than studies conducted in Dubai (19.4%), Iran (14.5%), and India (13.1%).[15-17] Dissimilitude in these deferral rates may be due to variation in history questionnaire, sample size and differences in research methodology.[18]

The most common reason for deferral in our study was low haemoglobin (36 per cent), with rejected donors' haemoglobin averaging 11.3± 0.9 mg/dl. Iqbal *et al*. found that low haemoglobin was the most common reason for deferral. However, deferral rates were greater (50.3 per cent).[19]

This contrasts a regional study from Karachi by Jamal *et al*. which stated a similar deferral rate (24%). However, Injections were the most common cause of deferrals, followed by low haemoglobin.[20]

CONCLUSION

Low haemoglobin and injections or unintentional needle stick injuries were the two top causes for deferring donations. Donors who are adequately informed and educated on deferral rules can prevent these problems. Furthermore, despite the lesser number of contributions, women have a greater deferral rate, implying that females should not only be urged to donate blood but also to be mindful of their health state, which is critical for increasing a blood bank's blood supply.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

MA: & MZI: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

AQ: & UA: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

SR: & NS: Concept, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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